

REMARKS

Claims 1-26 are pending in this application. Attached hereto is a complete listing of all claims in the application, with their current status listed parenthetically. By this Response, claims 1 and 5 have been amended, and are presented with markings to indicate their current amendments. Claims 2-4, 6, 8 and 9 have been cancelled without prejudice to later prosecution, and claims 21-26 have been withdrawn without prejudice to later prosecution.

In paragraph 2 of the Office Action, the Examiner states the application contains claims directed to two patentably distinct species: Species I (claims 1-20); and Species II (claims 21-26).

By this Response, Applicant affirmatively elects Species I (claims 1-20) for continued examination. Accordingly, Applicant withdraws claims 21-26 without prejudice to later prosecution as non-elected claims.

However, Applicant expressly reserves his right under 35 U.S.C. § 121 to file one or more divisional or continuation applications directed to the non-elected subject matter during the pendency of this application, or an application claiming the benefit of this application under 35 U.S.C. § 120.

Rejection Under 35 U.S.C. § 102

In paragraphs 6 and 7 of the Office Action, the Examiner rejects claims 1-13 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent 5,715,236 ("Gilhousen"). As discussed below, Applicant respectfully traverses this rejection.

A. The Law of Anticipation and Enabling Prior Art References

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. M.P.E.P. § 2131. The identical invention must be shown in as complete detail as is contained in the claim. *Id.*

However, Applicant submits that independent claims 1 and 5 each have elements that cannot be found, either expressly or inherently, in Gilhousen. Specifically, both claims 1 and 5 recite "an ultra-wideband pulse detector." Gilhousen has no teaching or suggestion of ultra-wideband communication technology.

Gilhousen relates to the generation of signal waveforms in a conventional CDMA cellular telephone system. Conventional cellular communication employs continuous sine waves that are transmitted at a specific frequency. Specifically, Gilhousen teaches transmission "in the 850 MHz cellular radio frequency band" (col. 2, lines 15-16). This is because, in the United States, the Federal Communications Commission has limited cellular phone communications to the 800 to 900 MHz band. Within this frequency band, Gilhousen teaches "the waveform utilized in the cellular telephone system should be less than 1.5 MHz in bandwidth" (col. 8, lines 8-9).

Gilhousen then teaches various methods of modulating data onto the 850 MHz carrier frequency. For example, Gilhousen teaches psuedo-random (PN) "sequences that provide orthogonality between the users so that mutual interference will be reduced" (col. 4, lines 35-36). Also, cellular communications are "encoded, interleaved, bi-phase shift key (BPSK) modulated" along with "quadrature phase shift key (QPSK) spreading of the covered symbols" (col. 4, lines 48-51).

Thus, Gilhousen teaches conventional 1.5 MHz bandwidth cellular communication using a 850 MHz carrier frequency with BPSK and QPSK.

In contrast, the present invention employs ultra-wideband technology, which includes an ultra-wideband pulse detector. As stated in the Field of the Invention, the present invention "relates to an ultra wideband receiver." "Ultra wide band (UWB) is a wireless technology for transmitting large amounts of digital data over a wide spectrum of frequency bands with very low power" (page 4, lines 1-3).

As stated in the Summary of the Invention, the present invention “receives and demodulates data transmitted, **without a carrier frequency**, as a series of ultra-short, spread spectrum modulated electromagnetic pulses” (page 6, lines 8-9). In the present invention, data may be “transmitted via impulses having 100 picosecond risetime and 200 picosecond width, which corresponds to a bandwidth of between about **2.5 GHz and 5 GHz**” (page 15, lines 11-13). (emphasis added)

Thus, the claimed ultra-wideband technology is very different from the conventional cellular technology taught by Gilhousen. UWB (also known as “impulse radio”) employs pulses of electromagnetic energy that are emitted at nanosecond or picosecond intervals. Because the excitation pulse is not a modulated waveform, UWB has also been termed “carrier-free” in that no apparent carrier frequency is evident in the radio frequency (RF) spectrum. That is, the UWB pulses are transmitted without modulation onto a sine wave carrier frequency, in contrast with conventional radio frequency technology (i.e., Gilhousen).

In summary, Gilhousen teaches conventional communications using a 850 MHz continuous sine wave carrier frequency, with a 1.5 MHz bandwidth. In contrast, Applicant claims ultra-wideband pulse communications comprising a plurality of discrete pulses that may have a bandwidth of up to 5 GHz.

Clearly, these two technologies are as different as apples and oranges.

Concluding, Gilhousen contains no teaching or suggestion of an ultra-wideband technology, and as discussed above, ultra-wideband technology functions completely differently than conventional carrier wave technology. Therefore, the anticipation rejection of independent claims 1 and 5 is respectfully traversed. Specifically, Gilhousen does not teach or suggest all of the claim elements found in independent claims 1 and 5. And, because currently-pending claims 7, and 10-13 depend from claim 5, it is respectfully submitted that the rejection of claims 7 and 10-13 have been traversed by virtue of their dependency from claim 5. M.P.E.P. § 2143.03.

Second Rejection Under 35 U.S.C. § 102

In paragraph 8 of the Office Action, the Examiner rejects claims 1-13 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent 5,677,927 ("Fullerton"). As discussed below, Applicant respectfully traverses this rejection.

A. The Law of Anticipation and Enabling Prior Art References

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. M.P.E.P. § 2131. The identical invention must be shown in as complete detail as is contained in the claim. *Id.*

However, Applicant submits that amended independent claims 1 and 5 each have elements that cannot be found, either expressly or inherently, in Fullerton. Specifically, claim 1 now recites, in part:

" . . . a data recovery unit operatively coupled to said pulse detector, said data recovery unit configured to receive spread spectrum RF signals modulated by on-off keying and pulse amplitude modulation."

Amended claim 5 now recites, in part:

" . . . a data recovery unit operatively coupled to said pulse detector, said data recovery unit configured to receive spread spectrum RF signals having different pulse repetition frequencies and modulated by pulse amplitude modulation."

Fullerton contains no teaching or suggestion of ultra-wideband (UWB) communication that employs on-off keying and pulse amplitude modulation (as in claim 1) or pulse amplitude modulation with different pulse repetition frequencies (as in claim 2).

Instead, Fullerton teaches an UWB communication system that uses one or more subcarriers (Abstract). "The impulse radio uses modulated subcarrier(s) for time positioning a periodic timing signal or a coded timing signal" (Abstract). Put differently, Fullerton uses a subcarrier to modulate the UWB, or impulse pulses. Fullerton then distinguishes his subcarrier invention by stating: "Prior impulse systems used non-subcarrier, baseband modulation (col. 2, lines 65-66). Fullerton also states: "the use of a subcarrier is an elegant, counter intuitive addition to the time domain impulse radio design" (col. 6, lines 58-60).

Applicant's claimed invention **IS** the non-subcarrier, baseband modulation type, which Fullerton distinguishes his invention from.

Futhermore, Fullerton further teaches: "Amplitude and frequency/phase modulation are unsuitable for this particular form of impulse communications" (col. 9, lines 29-30). Thus, **Fullerton teaches directly away from using amplitude modulation in UWB communications.**

Therefore, Applicant respectfully submits that the above-described amendments and the accompanying response have traversed the rejection of independent claims 1 and 5. Because currently-pending claims 7, and 10-13 depend from claim 5, it is respectfully submitted that the rejection of claims 7 and 10-13 have been traversed by virtue of their dependency from claim 5. M.P.E.P. § 2143.03.

Rejection Under 35 U.S.C. §103(a)

In paragraphs 9 and 10 of the Office Action, claims 14-20 stand rejected as unpatentable under 35 U.S.C. § 103(a) over Fullerton in view of Gilhousen. Applicant respectfully traverses this rejection.

A. The Law of Obviousness

In order to establish a prima facie case of obviousness, three basic criteria must be met:

"First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined), must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on the applicant's disclosure." M.P.E.P. § 2142.

The Examiner's Section 103 rejection combines two references, Fullerton and Gilhousen. Because a modification to the prior art is required to support this 35 U.S.C. section 103 rejection, an appropriate motivation to modify must be set forth in order to establish a *prima facie* case of obviousness. *See, In re Fritch*, 972 F.2d 1266 (Fed. Cir. 1992). The motivation to modify will be discussed below:

I. No motivation to combine references

As discussed above, Fullerton teaches ultra-wideband, or impulse radio communication, which uses discrete electromagnetic pulses that may occupy bandwidths spanning hundreds of megahertz. Specifically, Fullerton teaches Gaussian monocycles having: a 0.5 nanosecond pulse width; a 2 gigahertz center frequency; and which occupy a bandwidth of approximately 160% of the center frequency (i.e., 3.2 gigahertz) [col. 8, lines 24-57].

In contrast, Gilhousen teaches conventional communication that uses a substantially continuous sinusoidal carrier wave that operates at specific, assigned radio frequency channels. Specifically, Gilhousen teaches conventional communications using a 850 MHz continuous sine wave carrier frequency, with a 1.5 MHz bandwidth (col. 2, lines 15-16 and col. 8, lines 8-9).

These are completely different communication technologies, and thus there is no motivation to combine these references.

II. No reasonable expectation of success.

The second prong of a *prima facie* case of obviousness requires a reasonable expectation of success. However, according to M.P.E.P. § 2142.01 "if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious."

The Examiner proposes to combine Fullerton with Gilhousen. As discussed above, Gilhousen employs conventional carrier wave technology that emits a continuous waveform at a specific, narrow frequency. In contrast, Fullerton teaches ultra-wideband, or impulse radio technology that emits discrete electromagnetic pulses that span gigahertz of frequency.

Clearly, a fundamental change to Fullerton's principle of operation is required for the Examiner's proposed combination, and thus there is no reasonable expectation of success.

In view of the above discussion, Applicant respectfully submits that the Section 103 rejection of claims 14-20 has been traversed.


Conclusion

Applicant believes that this Response has addressed all items in the Office Action. Accordingly, favorable reconsideration and allowance of claims 1, 5, 7 and 10-20 at an early date is solicited. No fee is believed due with this response. However, the Commissioner is authorized to charge any fee required to our Deposit Account No. 50-3143, in the name of Pulse-Link, Inc. Should any issues remain unresolved, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

Date

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